

WHAT IS CLAIMED IS:

1. A recording apparatus for forming a color
image on the recording material, comprising
a recording head having a plurality of recording
5 elements;

recording head driving means for driving the
recording elements of said recording head in
accordance with image data to form an image on the
recording material;

10 a plurality of supplementing means for
effecting supplementations, in different manners, for
supplementing defects in a recorded image resulting
from a non-operating recording element of said
recording elements; and

15 control means for selectively operating said
plurality of supplementing means depending on a record
image to effect the supplementation.

2. An apparatus according to Claim 1, wherein
20 said supplementing means includes first supplementing
means for effecting supplementation for a recording
position which is to be recorded by the non-operating
recording element with a color which is different from
a color of said non-operating recording element.

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3. An apparatus according to Claim 1, wherein
supplementing means includes second supplementing

means for effecting supplementation for the defect by
correcting image data corresponding to a recording
element adjacent to the non-operating recording
element, on the basis of image data corresponding to
5 the non-operating recording element.

4. An apparatus according to Claim 1, wherein
said supplementing means includes first supplementing
means for effecting supplementation for a recording
10 position which is to be recorded by the non-operating
recording element with a color which is different from
a color of said non-operating recording element. ;
and second supplementing means for effecting
supplementation for the defect by correcting image
15 data corresponding to a recording element adjacent to
the non-operating recording element, on the basis of
image data corresponding to the non-operating
recording element.

20 5. An apparatus according to Claim 1, wherein
said control means selects said supplementing means in
accordance with a duty of the image to be recorded..

25 6. An apparatus according to Claim 1, wherein
when the image to be recorded has a high duty, said
control means selects said first supplementing means,
and when the image to be recorded has a low duty, said

control means selects said second supplementing means.

7. An apparatus according to Claim 2, wherein
said first supplementing means effects recording with
5 different colors, and effects recording with the same
colors as the non-operating recording elements but
with similar lightnesses.

8. An apparatus according to Claim 7, wherein
10 said first supplementing means includes correcting
means for correcting image data corresponding to the
non-operating recording elements in accordance with
the color corresponding said to the recording element
effecting the supplementation, said first
15 supplementing means effects the supplementation on the
basis of the image data corrected by said correcting
means.

9. An apparatus according to Claim 3, wherein
20 said second supplementing means corrects an image
density indicated by the image data corresponding to
the recording element which is adjacent to the non-
operating recording element in accordance with the
image density indicated by multi-value image data for
25 the non-operating recording element.

10. An apparatus according to Claim 1, wherein

the non-operating recording element includes a recording element which has become incapable of recording operation.

5 11. An apparatus according to Claim 1, wherein said recording head includes a plurality of nozzles and wherein the ink is ejected from the nozzle by driving the recording element.

10 12. An apparatus according to Claim 11, wherein said recording element includes an electrothermal transducer for supplying thermal energy to the ink to generate a bubble in the ink.

15 13. A method for forming a color image on the recording material in accordance with image data, using a recording head having a plurality of recording elements, said method comprising the steps of:

20 a step of identifying non-operating recording element of the plurality of recording elements;

 a step of discriminating an image recorded by said recording head;

25 a step of providing different supplementing manners for supplementing defects in a recorded image resulting from a non-operating recording element of said recording elements, selecting a supplement manner from the different supplementing manners, and

effecting control in accordance with the selected manner; and

a step of effecting recording with supplementation for the non-operating recording element through the selected manner.

14. A method according to Claim 13, wherein said supplementing step includes first supplementing step of effecting supplementation for a recording position which is to be recorded by the non-operating recording element with a color which is different from a color of said non-operating recording element.

15. A method according to Claim 13, wherein supplementing step includes second supplementing step of effecting supplementation for the defect by correcting image data corresponding to a recording element adjacent to the non-operating recording element, on the basis of image data corresponding to the non-operating recording element.

16. A method according to Claim 13, wherein said supplementing means includes first supplementing step of effecting supplementation for a recording position which is to be recorded by the non-operating recording element with a color which is different from a color of said non-operating recording element; and second

5 corresponding to the non-operating recording element.

10 colors as the non-operating recording elements but
with similar lightnesses.

15 correcting image data corresponding to the non-
operating recording elements in accordance with the
color corresponding said to the recording element
effecting the supplementation, said first
supplementing step effects the supplementation on the
20 basis of the image data corrected by said correcting
means.

25 indicated by the image data corresponding to the
recording element which is adjacent to the non-
operating recording element in accordance with t

image density indicated by multi-value image data for the non-operating recording element.

20. A method according to Claim 16, wherein when
5 the image to be recorded has a high duty, said selecting step selects said first supplementing step, and when the image to be recorded has a low duty, said selecting step selects said second supplementing step.

10 21. A method according to Claim 13, wherein the non-operating recording element includes a recording element which has become incapable of recording operation.

15 22. A memory medium storing a program for executing said recording method as defined in Claim 13.

20 23. A recording apparatus for forming a color image on the recording material with different colors, comprising:

a recording head having a plurality of recording elements;

25 recording head driving means for driving the recording elements of said recording head in accordance with image data to form an image on the recording material; and

supplementing means for effecting
supplementation recording with a different color of
the non-operating recording element and with similar
lightnesses, for a recording position which is to be
5 recorded by the non-operating recording element.

24. An apparatus according to Claim 23, wherein
said supplementing means includes correcting means for
correcting image data corresponding to the non-
10 operating recording elements in accordance with the
color with which the supplementation is to be
effected, said supplementing means effects the
supplementation on the basis of the image data
corrected by said correcting means.

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25. An apparatus according to Claim 23, wherein
the non-operating recording element includes a
recording element which has become incapable of
recording operation.

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26. An apparatus according to Claim 23, wherein
said recording head includes a plurality of nozzles
and wherein the ink is ejected from the nozzle by
driving the recording element.

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27. An apparatus according to Claim 26, wherein
said recording element includes an electrothermal

transducer for supplying thermal energy to the ink to generate a bubble in the ink.

28. A recording method for forming a color image
5 on the recording material with different colors, using
a recording head having a plurality of recording
elements, comprising the steps of:

a step of identifying non-operating recording
element of the plurality of recording elements;

10 a step of effecting recording in accordance with
image data; and

a step of effecting supplementation recording
with a different color of the non-operating recording
element and with similar lightnesses, for a recording
15 position which is to be recorded by the non-operating
recording element.

29. A method according to Claim 28, wherein said
supplementing step includes a correcting step for
20 correcting image data corresponding to the non-
operating recording elements in accordance with the
color with which the supplementation is to be
effected, said supplementing step effects the
supplementation on the basis of the image data
25 corrected by said correcting step.

30. A method according to Claim 28, wherein the

non-operating recording element includes a recording element which has become incapable of recording operation.

5 31. A method according to Claim 28, wherein said recording head includes a plurality of nozzles and wherein the ink is ejected from the nozzle by driving the recording element.

10 32. A method according to Claim 31, wherein said recording element includes an electrothermal transducer for supplying thermal energy to the ink to generate a bubble in the ink.

15 33. A memory medium storing a program for executing said recording method as defined in Claim 28.

20 34. A recording apparatus for forming a color image on the recording material with different colors, comprising:

 a recording head having a plurality of recording elements;

25 recording head driving means for driving the recording elements of said recording head in accordance with image data to form an image on the recording material; and

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supplementing means for effecting
supplementation recording with a recording element for
black color recording, for a recording position
corresponding to a non-operating recording element
5 among the recording elements for non-black color
recording.

35. An apparatus according to Claim 34, wherein
said supplementing means includes correcting means for
10 correcting the image data corresponding to the non-
operating recording element in accordance with a color
indicated by the image data, and said supplementing
means effecting the recording of the basis of the
image data corrected by said correcting means.

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36. An apparatus according to Claim 34, wherein
the non-operating recording element includes a
recording element which has become incapable of
recording operation.

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37. An apparatus according to Claim 34, wherein
said recording head includes a plurality of nozzles
and wherein the ink is ejected from the nozzle by
driving the recording element.

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38. An apparatus according to Claim 37, wherein
said recording element includes an electrothermal

transducer for supplying thermal energy to the ink to generate a bubble in the ink.

39. A recording method for forming a color image
5 on the recording material with different colors, using
a recording head having a plurality of recording
elements, comprising the steps of:

a step of recording an image on the recording
material by driving a plurality of recording elements
10 of said recording head in accordance with image data;
and

a step of effecting supplementation recording
with a recording element for black color recording,
for a recording position corresponding to a non-
15 operating recording element among the recording
elements for non-black color recording.

40. A method according to Claim 39, wherein said
supplementing step includes a correcting step for
20 correcting the image data corresponding to the non-
operating recording element in accordance with a color
indicated by the image data, and said supplementing
means effecting the recording of the basis of the
image data corrected by said correcting means.

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41. A method according to Claim 39, wherein the
non-operating recording element includes a recording

element which has become incapable of recording operation.

42. A method according to Claim 39, wherein said
5 recording head includes a plurality of nozzles and
wherein the ink is ejected from the nozzle by driving
the recording element.

43. A method according to Claim 42, wherein said
10 recording element includes an electrothermal
transducer for supplying thermal energy to the ink to
generate a bubble in the ink.

44. A memory medium storing a program for
15 executing said recording method as defined in Claim
39.

45. A recording apparatus for forming a color
image on the recording material, comprising
20 a recording head having a plurality of recording
elements;

inputting means for inputting multi-value
image data indicative of an image density;

correcting means for correcting image data
25 corresponding to a recording element which is adjacent
to the non-operating recording element of said
plurality of recording elements;

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generating means for generating driving data for driving the recording elements corresponding thereto on the basis of the image data corrected by said correcting means; and

5 recording control means for controlling the recording elements of said recording head in accordance with the driving data thus generated to effect recording.

10 46. An apparatus according to Claim 45, wherein said correcting means corrects multi-value image data corresponding to the recording element located adjacent to the non-operating recording element.

15 47. An apparatus according to Claim 45, wherein the non-operating recording element includes a recording element which has become incapable of recording operation.

20 48. A method for forming a color image on the recording material in accordance with image data, using a recording head having a plurality of recording elements, said method comprising the steps of:

 a step of inputting multi-value image data
25 indicative of an image density;

 a step of identifying a non-recording element of the plurality of the recording elements on the

basis of a variation in densities of a test pattern recorded by said recording head;

5 a step of correcting, on the basis of the variation of the densities, image data corresponding to respective recording elements to raise an image density of the image data for the recording element which is adjacent to the non-operating recording element; and a step of correcting, on the basis of the variation of the densities, image data corresponding to respective recording elements to raise an image density of the image data for the recording element which is adjacent to the non-operating recording element; and

10 a step of generating driving data for driving the recording elements corresponding thereto on the basis of the image data corrected by said correcting means;

15 a step of recording controlling the recording elements of said recording head in accordance with the driving data thus generated to effect recording.

49. A method according to Claim 48, wherein said correcting means corrects multi-value image data corresponding to the recording element located adjacent to the non-operating recording element.

50. A method according to Claim 48, wherein the

non-operating recording element includes a recording element which has become incapable of recording operation.

- 5 51. A memory medium storing a program for
executing said recording method as defined in Claim
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